


19 
 Europäisches Patentamt
 European Patent Office
 Office européen des brevets

11 Publication number:

0 040 339
A1

12

EUROPEAN PATENT APPLICATION

21 Application number: 81103295.2

51 Int. Cl.³: H 05 B 39/04

22 Date of filing: 01.05.81

30 Priority: 17.05.80 DE 3018946

01.08.80 DE 3029191

01.08.80 DE 3029200

01.08.80 DE 3029201

12.11.80 DE 3042551

12.11.80 DE 3042575

12.11.80 DE 3042598

30.05.80 DE 8014523 U

43 Date of publication of application:
25.11.81 Bulletin 81/47

84 Designated Contracting States:
AT BE CH FR GB IT LI LU NL SE

71 Applicant: Christiansen, Dieter
Leipziger Strasse 47
D-4020 Mettmann(DE)

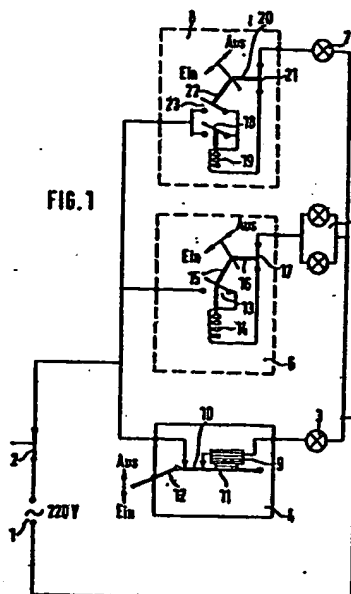
72 Inventor: Christiansen, Dieter
Leipziger Strasse 47
D-4020 Mettmann(DE)

72 Inventor: Redies, Bernd, Dr.
Im Rottfeld 17
D-4000 Düsseldorf(DE)

74 Representative: Redies, Bernd, Dr. rer. nat. et al,
Redies, Redies, Türk & Gille Brucknerstrasse 20
D-4000 Düsseldorf 13(DE)

64 A centrally controlled lighting installation having a plurality of individually-switchable individual light points, central switch elements and individual light switches therefor.

67 This invention relates to a lighting system having a plurality of individual light points or groups of individual light points which may be controlled by means of a central switch element, acting on all individual light points, whereby the function of the individual light points (or groups of individual light points to be jointly connected) is maintained independent of the central control and the individual light points may be switched on and off individually and independently, this lighting system being installable in a most simple manner with the use of already installed two-wire cabling and without additional cabling or devices. The present invention also relates to the central switch element and to the individual light switches associated with the individual light points or groups of individual light points, in different embodiments.



EP 0 040 339 A1

- 1 -

A CENTRALLY CONTROLLED LIGHTING INSTALLATION
HAVING A PLURALITY OF INDIVIDUALLY-SWITCH-
ABLE INDIVIDUAL LIGHT POINTS, CENTRAL
SWITCH ELEMENTS AND INDIVIDUAL LIGHT
SWITCHES THEREFOR

Lighting in comparatively large buildings, which involves a plurality of individual light points, is controlled automatically in many cases today by the artificial lighting being switched on or off, for example, when night falls or at sunrise. This is particularly appropriate in times of energy shortages, because the employee using the artificial light source does not often think in particular of switching off the lights and so the light source remains on, even when there is sufficient daylight in the place of work, or the light source cannot be individually switched off upon leaving the place of work before switching off by automatic operation. In offices, in which the energy requirement of the lighting may make up approximately 30% of the total energy requirement for the building, this may result in considerable and undesired costs.

The central automatic control of the lighting is effected, for example, by switch clocks set at specific times. As a result of the switching off operation, the circuit is permanently broken. However, the use of such switching systems has the disadvantage that weather conditions and changes in the intensity of daylight caused by the weather are not taken into account by the systems, so that when there is a dense covering of cloud after sunrise the lighting is switched off too early or when dense cloud is building up the artificial lighting is not turned on or it is turned on too late early in the evening. Switching systems of this type also only allow a central switching on or off of the complete installation.

- 2 -

There are also so-called "dimness switches", by which the artificial lighting is switched on or off depending on the actual intensity of daylight in a suitable manner by a current pulse released upon a specific light intensity. However, these systems also have the disadvantage that a control corresponding to the actual requirement of light in all parts of the building is impossible. The requirement for artificial lighting may vary quite considerably in the individual parts of the building, for example, depending on the aspect or on the distance from neighbouring houses and the height thereof or on the amount of trees in front of some of the windows of the building. This problem could, it is true, be alleviated by dividing the total lighting system into individual groups having a similar average light requirement and by switching the lighting on and off in each such section by a switch element controlled by natural light. However, the light requirement which varies considerably from person to person at the workplace cannot be considered either, so that people's health may also suffer to a considerable extent due to inadequate lighting, even with such a current-energy-saving central control of the lighting in buildings. In this case as well, all of the lighting plant (or sections thereof) may either be switched on or switched off, so that individual switching of the individual light point is again impossible. However, the arrangement of such control elements at each individual workplace in such buildings has been too expensive until the present time.

The object of this invention is to provide a lighting system having a plurality of individual light points which may be centrally controlled and in which each individual light point (or small groups of individual light points, such as the light points of an entire

- 3 -

room) is simultaneously and individually switchable, so that even after general switching off of the lighting installation by the central control, individual light points (or groups of light points) may be switched on again or they may be switched off independently of the complete installation before the general switching off by the central automatic control. It is a particular object of the invention to provide such a lighting system which is operable with the already generally installed and therefore generally available two-wire cabling, so that additional cabling and supplementary devices are not necessary.

The centrally controlled lighting installation according to the invention having a plurality of individually-switchable individual light points or groups of individual light points is characterised in that a switch element having a normal switch position and a temporary adjustable, variable switch position is provided centrally in the circuit, i.e. between the power source and the first branch of the circuit to the individual light points connected in parallel, which switch element keeps the circuit closed in its normal switch position and the circuit is broken for a short time by operating the switch element, and a switch element which may be operated by a temporary current pulse is associated with each individual light point or groups of individual light points, the switch contact of this switch element being kept closed during the current passage and opening when there is a break in the circuit and remaining open even when the central switch element is subsequently closed, without further intervention, and it is either:

- a) designed so that it may also be opened and closed mechanically from outside, or
- b) designed so that it may also be closed mechanically from outside and in this design, another switch

element is provided having a normal (continuous) switch position and a temporary adjustable, variable switch position and it is associated with this switch element and is connected in series thereto and it keeps the
5 circuit closed in its normal switch position and the circuit is broken for a short time as a result of its operation, or

- c) designed without mechanical means for operation from outside, as embodiments a) and b) but wherein a second
10 switch element is provided having a normal switch position and a temporary adjustable, variable switch position, which second switch element is associated with this switch element operated by the temporary current pulse and is connected in series thereto, this
15 second switch element keeping the circuit closed in its normal switch position and breaking the circuit for a short time as a result of its operation, and wherein a third switch element is provided having a normal switch position and a temporary adjustable, variable switch
20 position, which third switch element is associated with the switch element operated by a temporary current pulse and is connected parallel to the switch contact of this switch element, this third switch element keeping its switch contact open in its normal switch position and
25 its switch contact and thereby the circuit closed for a short time as a result of its operation even when the switch contact of the switch element which may be operated by the temporary current pulse is open.

The switch element which may be operated by a
30 temporary current pulse is a magnetic switch in the preferred embodiment of the individual light switch according to the invention associated with the individual light points or groups of individual light points. Within the context of the present invention,

- 5 -

the term "magnetic switch" is understood to mean a switch element having a switch contact and an electromagnet connected in series, which switch contact is closed and is kept closed when current flows through the electromagnet, e.g. by a lever arm which is then attracted by the electromagnet, and which is opened and is kept open when the current no longer flows through the electromagnet, e.g. by a spring acting on the switch contact or on the lever arm connected therewith or by a suitable three-dimensional arrangement or even by its inherent weight.

This preferred embodiment of the lighting installation according to the invention is characterised in that a switch element having a normal switch position and a temporary adjustable, variable switch position is provided centrally in the circuit, i.e. between the power source and the first branch of the circuit to the individual light points connected in parallel, which switch element keeps the circuit closed in its normal switch position and the circuit is broken for a short time when the switch element is operated and a magnetic switch is associated with each individual light point or groups of individual light points, the switch contact of the magnetic switch being kept closed during the current flow and opening when there is a break in the circuit and remaining open even when the central switch element is subsequently closed, without further intervention, and said magnetic switch is either:

- a) designed so that it may also be opened and closed mechanically from outside, or
- b) designed so that it may also be closed mechanically from outside and in this design, another switch element having a normal switch position and a temporary adjustable variable switch position is

- provided, associated with the magnetic switch and connected in series thereto, which switch element keeps the circuit in its normal switch position and the circuit is broken for a short time when the switch element is operated, or
- 5 c) designed without mechanical means for operation from outside, as embodiments a) and b), but wherein a second switch element having a normal switch position and a temporary adjustable, variable switch position is provided which second switch element is associated with the magnetic switch and connected in series thereto, this second switch element keeping the circuit closed in its normal switch position and breaking the circuit for a short time when the switch element is operated, and wherein a third switch element having a normal switch position and a temporary adjustable, variable switch position is provided associated with the magnetic switch and connected parallel to the switch contact of the magnetic switch and connected in series to the electromagnet of the magnetic switch, this third switch element keeping its switch contact open in its normal switch position and when this third switch element is operated, its switch contact and thereby the circuit is closed for a short time even when the switch contact of the magnetic switch is open.
- 10
15
20
25

The lighting installation according to the invention is schematically illustrated and explained in the following drawings and circuit diagrams with respect to a preferred embodiment, but without being restricted thereto.

30

The lighting installation illustrated in Figure 1 with the power source 1 and the switch element 2 positioned centrally in the circuit has four individual light points, wherein individual switches

35

- 7 -

4, 6 and 8 provided with magnetic switches are associated with each of the individual light points 3 and 7 or with the group 5 of light points to be connected together, in the different embodiments of the lighting installation according to the invention. The individual switch 4 corresponds to embodiment a), The individual switch 6 corresponds to embodiment b) and the individual switch 8 corresponds to embodiment c).

The central switch element 2 has a normal switch position and a temporary adjustable, variable switch position, whereby the switch contact is closed in its normal switch position, e.g. by a suitable spring provided in the switch element, and thereby the circuit of the lighting installation according to the invention is also kept closed, whereas as a result of operating the switch element, e.g. by pressure against the force of the spring, the switch contact and thereby the circuit of the lighting plant according to the invention may be broken for a short time.

In the embodiment a) of the individual light switch 4 associated with the individual light point 3, the magnetic switch is not only designed such that it may be operated by the lever arm 11, which is attracted by the electromagnet 9, is positioned rotatably at one of its ends and simultaneously causes the contact closure of the switch contact 10 of the magnetic switch, but it is also designed so that it may be opened and closed mechanically from outside via the operating lever 12 which is rotatably secured on its other free end.

If, in embodiment a) of the lighting installation according to the invention, the current is interrupted for a short time by operating the central switch 2, the electromagnet 9, due to the inherent

- 8 -

weight of the lever arm 11 positioned thereunder, releases this arm 11, so that the switch contact 10 is opened and is kept open even when the central switch 2 returns to its closed normal switch position.

5 If artificial light is required at the individual light point against the command of the central switching point 2, the switch contact 10 is closed by pressing in the operating lever 12 of this embodiment of the individual switch and it is kept
10 closed due to the resulting flow of current through the electromagnet 9. However, if switching off of this individual light point is required or a switching off of the light point which is subsequently switched on again as described is required before the central
15 switching off of the entire lighting installation, effected by operating the circuit element 2, the switch contact 10 is opened by pushing the operating lever 12 up, applying an adequate pressure against the attractive force of the electromagnet 9, so that
20 the electromagnet loses its attractive force and the switch contact 10 is opened.

In the embodiment b) of the lighting installation according to the invention, the magnetic switch is only designed so that it may also be closed mechanically from outside. On the frame of the individual
25 switch 6 associated with the individual light point 5, the switch contact 13 of the magnetic switch may not only be operated by the electromagnet 14 and the lever arm 14a which may be attracted by the electromagnet 14, but the switch contact 13 may also be closed using
30 the lever arm 15 which may be operated from outside the individual switch 6 by pressing in this lever arm 15. The switch element 16, 17 having a normal switch position and a temporary adjustable, variable switch
35 position is also provided in the individual switch, is

- 9 -

connected in series to the magnetic switch and which, like the central switch element 2 keeps its switch contact 17 and thereby the circuit closed in its normal switch position and when it is operated by pressing in the "Off" part of the operating switch, the switch contact 17 is broken for a short time via its operating lever 16 and thus the circuit is also broken for a short time.

If, as in the previously described case, the central switch 2 is opened for a short time, the current flow in the electromagnet 14 and thus the resulting attraction is terminated and the electromagnet 14, due to, for example, a spring acting on the lever arm of the magnetic switch, releases the attracted lever arm and the switch contact 13 of the magnetic switch is opened and is kept open as a result of this action. If the individual light point is to be switched on again against the central control command of the switch element 2, the switch contact 13 of the magnetic switch and thus the complete circuit is closed by pressing in this lever arm 15 and, due to the then restored attraction of the electromagnet 14, the switch contact 13 is kept closed. If the individual light point is then to be later switched off again, the circuit is broken for a short time by operating the switch element 16, 17 provided in the individual switch 6 and thus associated with the magnetic switch, so that the electromagnet 14 releases the lever arm of the magnetic switch and it re-opens its switch contact 13 and keeps it open. Thus, in the individual switch of the embodiment b) of the lighting installation according to the invention, the switch contact 13 of the magnetic switch takes over the switching on operation, apart from keeping its contact closed, whereas the switching off operation is taken over by the switch

- 10 -

element 16, 17 associated therewith. Since, as is known, due to the closing or opening operation of switch contacts and the sparking caused by these operations, power peaks may occur, the magnet coil
5 in embodiment b) may optionally be provided with a lower capacity as compared to embodiment a).

The embodiment c) provides an even lower load for the magnetic switch, in which embodiment the switch contact 18 of the magnetic switch together with its
10 magnet 19 only takes over the task of keeping the circuit closed. In addition to the switch element 20, 21 of the embodiment b) connected in series to the magnetic switch, another switch element 22, 23 having a normal switch position and a temporary adjustable,
15 variable switch position is provided which is connected parallel to the switch contact 18 of the magnetic switch and is connected in series to the magnet 19 of the magnetic switch and it keeps its switch contact
20 23 open in its normal switch position and its switch contact is closed for a short time when it is operated, so that the magnetic switch is designed to be operated from outside without any additional mechanical possibility. As a result of pressing in the operating lever
25 20 associated with the switch contact 21, the circuit is broken for a short time, whereas upon pressing the operating press lever 22 associated with the switch contact 23, the circuit is even closed when the switch contact 18 of the magnetic switch is open.

If, as in the previously mentioned examples,
30 the central switch 2 is operated and as a result of this, the circuit is broken for a short time, the switch contact 18 of the magnetic switch is opened, for example, due to a spring provided in the magnetic switch and holding its lever arm. If the individual
35 light point is to be switched on again against the

- 11 -

command of the central switching point 2, the switch contact 23 is closed for a short time by actuating the operating lever 22, designed in this case as a rocker switch, and the switch contact 18 of the magnetic switch is closed and is kept closed, due to the current flow through the electromagnet of the magnetic switch. If the individual light point is then to be switched off again independently of the central control, the switch contact 21 and thus the circuit for the individual light switch 7 is broken for a short time by actuating the operating lever 20 and thus, the switch contact 18 of the magnetic switch associated therewith is also re-opened.

Limited by the two-wire design and thus by the load switching of the magnet coil of the magnetic switch and the considerable load variations in the circuit of such lighting installations, the magnet of the magnetic switch may be charged with different loads such that by adjusting the design of the coil according to the load peak, the magnet of the magnetic switch is not yet energised enough in the lower load range to reliably close the switch contact of the magnetic switch and to also keep it closed. However, if the coil of the magnetic switch is designed such that the switch contact of the magnetic switch is closed reliably even in the lower load range and is kept closed with an adequate strength, there is a danger of considerable overheating of the magnet and thus a danger of fire in the building having such lighting installations where there is a load in the range of the peaks or even in the middle range of the load variations. In addition thereto, magnetic switches of this type have to be so large that it is no longer possible to house the individual switches produced therewith in conventional sized counter-sinkable wall boxes.

However, it is a particular object of an embodiment of the present invention to design the individual light points or groups of individual light points to be able to be switched on and off while using available two-wire lighting installations with conventionally-sized connection boxes and without additional devices, i.e. exchanging the old switches for the new individual switches in lighting installations controlled centrally by a current pulse.

Another embodiment of the lighting installation according to the invention and of its individual light switches relates to the magnetic switches 9, 10, 11, 12 or 13, 14, 15, or 18, 19 of the individual switches. It is schematically illustrated in Figure 3, for the magnetic switches 13, 14, 15 or 18, 19 of the individual switches (see also Fig. 10 and 11). This applies accordingly to the magnetic switch 9, 10, 11, 12 of embodiment a) (see also Fig. 9).

The embodiment, which is improved with respect to heat control and is therefore particularly preferred, is characterised in that the magnetic switch is designed in the form of a double magnet having a common magnet core and two connected magnet coils 9a and 9b connected in parallel or 14a and 14b or 19a and 19b having respectively a switch contact 11a and 11b or 13a and 13b or 18a and 18b operated by the respective magnetic switch and connected in series to each magnet coil. One magnet coil is designed for low magnet power and it closes its contact when energised and keeps it closed, whereas the other coil and optionally also the contact lever of the switch contact associated with this coil is designed such that its switch contact only closes the contact and keeps it closed at a current intensity which corresponds to at least approximately three times, preferably four times, the minimum current intensity at which the magnetic switch with the magnet

- 13 -

coil for low magnet power closes the switch contact associated therewith and keeps it closed.

5 According to a preferred embodiment, the two magnet coils of the double magnet connected in parallel to each other are wound one upon the other over a common magnet core.

It is most particularly preferred for the common magnet core of the double magnet to be formed from sheets mounted in parallel.

10 In these preferred embodiments with double magnet, the variation range of the magnet power due to the load switching of the magnet coil is thus subdivided so that it is not necessary to construe the magnet coil to meet the highest magnet power demand with in
15 this variation range in order to avoid the generation of an excessive amount of heat. The exact division of the total power range is appropriately effected in that the magnet coil designed for low magnet power covers approximately one third of the total variation range
20 and approximately two thirds of the range is controlled by the magnet coil designed for greater magnet power. In this operation, the best division is to be established empirically for the respective design of the double magnet and switch contacts.

25 Instead of the magnetic switch, other switch elements which may be operated by a temporary current pulse, such as relays controlled by a transistor, may also be used, in particular in the embodiment c) of the lighting installation according to the invention, as
30 long as the relay is opened by this current pulse retransmitted via the mains of the lighting installation and may be opened and closed according to the individual embodiments from outside, and also separately for each individual light point, whether it is fully mechanical,
35 according to embodiment a), partly mechanical according to embodiment b) or fully non-mechanical by suitable

- 14 -

pulse transmitters associated with the individual light points according to embodiment c). However, the switch element 2 must then also be replaced by a suitable central pulse transmitter. The embodiment illustrated, in which the control pulse is provided by a temporary interruption in the current, allows, however, a particularly simple design and is therefore preferable.

The central switch element 2 may be operated manually or using suitable control devices. According to a particularly preferred embodiment, the central switch element 2 constitutes a switch element which may be operated by the energising of a magnet coil and this switch element is controlled both by a conventional switch clock having at least two adjustable switch positions for actuating the switch of the switch clock as well as by a dimness switch connected in parallel thereto and optionally adjustable with respect to the light sensitivity. A control element of this type is schematically illustrated in Figure 2 of the drawings as well as being illustrated as a separable part of the lighting installation in Figures 4 and 5. This control element has a conventional switch clock 24 with a conventional seven day/24 hour program and has at least two adjustable switch settings for actuating the switch of the switch clock 24 designed as a brush contact, a dimness switch 25 which is optionally adjustable with respect to the light sensitivity with a switch designed as a brush contact and having a separate light sensor 26 which may be connected via the terminal 32, a change-over switch 27 for connecting a first terminal of the switch contact with selectively either the one or other second terminal of the switch contact or with both terminals, a switch 2 which may be operated by exciting a magnet coil 28 and having a normal switch position while closing its switch contact and a variable switch

- 15 -

position which may be adjusted for a short time by operating the switch, while opening the switch contact. The mains voltage of the power source 1 is transformed by the transformer 29 to the control voltage of the control device for the central switch element 2.

According to a preferred embodiment, the control device also has a switch 30 on the frame whose switch contact is connected in parallel to the switches of the switch clock 24 and the dimness switch 25 and whose switch lever may be actuated mechanically or electromagnetically or the like, for example by a ripple central signal provided by an external signal transmitter 31.

Thus, the lighting installation according to the invention may be set for light or time-control or for both together by the change-over switch 27, so that the control may be effected both by the intensity of daylight as well as by the switch clock, so that, for example, in summer with a specific daylight intensity, the first switching off is effected centrally and a second control switching off may be carried out at a later time. Therefore, an extremely versatile control of the lighting installation according to the invention, being dependent on numerous conditions is possible with this control device.

Protection is not only claimed for the complete lighting installation of Figures 1 to 3, but also for the control element according to Figure 2, such as the individual light switches in the individual embodiments which may be produced separately and may be assembled into the lighting installations according to the invention using available two-wire cabling of hitherto conventional lighting plants.

Figure 4 shows a circuit diagram of the control element separate from the rest of the lighting installa-

- 16 -

tion, Figure 5 shows a top view of such a control element, Figures 6 to 8 show the individual light switches 4, 6 and 8 in the circuit diagram of Figure 1 schematically separate from the rest of the lighting installation in the preferred embodiment, Figures 9 to 11 show the individual light switches 4, 6 and 8 in the embodiment of Figure 3. Thus, Fig. 9 shows the individual light switch assigned to the lighting point 3 of Fig. 3, Fig. 11 shows the individual light switch assigned to the group 5 of lighting points of Fig. 3 and Fig. 10 shows the individual light switch assigned to the lighting point 7 of Fig. 3. Fig. 6 to 8 show in the same way the individual light switches assigned to the lighting points 3, 5 and 7 of Fig. 1 and 2.

CLAIMS

1. A centrally-controlled lighting installation having a plurality of individual-switchable individual light points or individually-switchable groups of individual light points, characterised in that a switch element having a normal switch position and a temporary adjustable, variable switch position is provided centrally in the circuit, said switch element keeping the circuit closed in its normal switch position and, as a result of its operation, breaks the circuit for a short time, and a switch element which may be operated by a temporary current pulse is associated to each individually-switchable individual light point or to each individually-switchable group of individual light points, the switch contact of said switch element being kept closed during the flow of current and opening when there is a break in the circuit and remaining open even during subsequent closure of the circuit without further intervention, and it is either:

- a) designed so that it may also be opened and closed mechanically from outside, or
- b) designed so that it may also be closed mechanically from outside and in this design, another switch element is provided having a continuous switch position and a temporary adjustable, variable switch position and it is associated with this switch element and is connected in series thereto and it keeps the circuit closed in its normal switch position and the circuit is broken for a short time as a result of its operation, or
- c) designed without mechanical means for operation from outside but wherein a second switch element is

provided having a normal switch position and a temporary adjustable, variable switch position, which second switch element is associated with this switch element operated by the temporary current pulse and is connected in series thereto, said second switch element keeping the circuit closed in its normal switch position and breaking the circuit for a short time as a result of its operation, and wherein a third switch element is provided having a normal switch position and a temporary adjustable, variable switch position, which third switch element is associated with the switch element operated by a temporary current pulse and is connected in parallel to the switch contact of this switch element, said third switch element keeping its switch contact open in its normal switch position and its switch contact and thereby the circuit closed for a short time as a result of its operation even when the switch contact of the switch element which may be operated by the temporary current pulse is open.

2. A centrally-controlled lighting installation according to claim 1, characterised in that the switch element which may be operated by the temporary current pulse is a magnetic switch whose switch contact and magnet coil are connected in series to each other and it is designed such that the switch contact is kept closed with a current flow through the magnet and it opens when there is a break in the circuit and it remains open without further intervention.

3. A centrally-controlled lighting installation according to claim 1 or 2, characterised in that the magnetic switch is designed in the form of a double magnet having a common magnet core and two magnet coils connected in parallel, in each case with a switch contact operated by the respective magnetic switch and connected in series to each magnet coil, whereby one magnet coil is designed for low magnet power and it closes its contact

- 3 -

and keeps it closed when energised, while the other coil and optionally also the contact lever is designed such that its contact only closes the contact and may keep it closed when there is a current intensity which
5 corresponds to at least approximately three times the minimum current intensity at which the magnetic switch with the magnet coil for low magnet power closes the switch contact associated therewith and keeps it closed.

4. A lighting installation according to claim
10 3, characterised in that the two magnet coils of the double magnet connected in parallel to each other are wound one upon the other over a common magnet core.

5. A lighting installation according to claims
15 3 or 4, characterised in that the common magnet core of the double magnet is formed from sheets packed in parallel.

6. A centrally-controlled lighting installation according to any of claims 1 to 5, characterised in that the switch of the central switch element is a switch
20 which may be operated by the energising of a magnet coil, and it may be energised by a conventional switch clock having at least two adjustable switch positions for actuating the switch of the switch clock or by a dimness switch having a light sensor, the switch being optionally
25 adjustable with respect to the light sensitivity, or it may be energised by another signal transmitter or by several of these signal transmitters combined.

7. A control element for lighting installations according to claim 6, characterised in that the following
30 are positioned on a frame having a suitable covering: a conventional switch clock (24) having at least two adjustable switch positions for actuating the switch of the switch clock (24); a dimness switch (25, 26, 32) which is optionally adjustable with respect to the light sensor
35 (26) which may be connected via a terminal

- 4 -

(32); a change-over switch (27) for connecting a first terminal of the switch contact with selectively either one or other second terminal of the switch contact or jointly with both terminals; a switch (28) which may be operated by energising a magnet coil and having a normal position while closing its switch contact (2) and a variable switch position which may be adjusted for a short time by operating the switch, while opening its switch contact; and three terminals (34), (35) and (36), whereby the terminal (34) is connected to one terminal of the switch contact both of the switch (2) as well as of the switch contact of the switch clock (25) and the terminal (35) is connected to the other terminal of the switch contact (2) of the switch (28) and the terminal (36) is connected to one terminal of the magnet coil (28), while the other terminal of the magnet coil (28) is connected to the other terminals of the switch contacts of the switches (25) and (30) via the change-over switch (27).

8. A control element according to claim 7, characterised in that a switch (30) is also provided whose switch contacts are connected to the terminal (34) and the magnet coil (28), connected parallel to the switches (25) and (30), and whose switch lever may be actuated mechanically or electromagnetically or the like by an external signal transmitter (31) which may be connected via the additional terminal (33).

9. An individual light switch having a two-wire connection for lighting installations controlled automatically by pulse switches according to one or more of claims 1 to 8, characterised in that it has a switch contact (10) and an electromagnet (9) which are connected in series to each other, whereby the switch contact is designed such that it may be closed and kept closed by the electromagnet when current flows through

- 5 -

the electromagnet and it may also be closed or opened mechanically from outside the individual light switch.

10. An individual light switch according to claim 9, characterised in that an at least partly magnetizable lever arm (11) is rotatably secured at one end on a suitable frame of a conventional size for light switches such that in the position which corresponds to the position after installation in the place of use it is rotatable about a horizontal axis, is designed as a switch contact lever electroconducting in one part, and is rotatably connected at its other end with a lever (12) which is secured rotatably in one point of the individual light switch positioned towards the top of the place of use and is secured so that it may pivot upwards and downwards and which in the lower position presses the lever (11) with its electroconducting part against two connection terminals (10) secured to the frame while closing this switch contact and it presses the magnetizable part of the lever (11) against the magnet core of the electromagnet (9) so that the electromagnet (9) holds the lever (11) in this position during the current flow, but when there is an interruption in the current flow through the electromagnet, it turns away due to its inherent weight or due to a spring of the electromagnet (9) holding the lever (11), while keeping the switch contact (10, 11) open.

11. An individual light switch having a two-wire connection according to claim 9 or 10 for lighting installations controlled automatically by pulse switches according to one or more of claims 1 to 8 characterised in that a switch element (17) which may be operated independently of the switch element (13) and which has a normal switch position and a temporary adjustable, variable switch position is connected in the circuit

- 6 -

between the two connection points and it closes the switch contact of the circuit element (17) in its normal switch position.

12. An individual light switch according to claim 11, characterised in that the switch element (17) is designed as a magnetic switch whose magnet coil and switch contact are connected in series.

13. An individual light switch according to claim 11 or 12, characterised in that the switch contact of the switch element (13) is firmly connected to the lever arm (15) of the switch element (13) and that the spring element of the switch element (13) causing the return to its normal switch position is designed such that on one hand, during an interruption in the current flow, the switch contact of the switch element (13) is opened and is kept open, and on the other hand, after closing of the switch contact of the switch element (13) during current flow through the electromagnet (14) of the switch element (13), the resulting force keeps the switch contact of the switch element (13) closed.

14. A light switch according to one or more of claims 11, 12 and 13, characterised in that the operating parts of the switch elements (16, 17) and (13, 15) are designed and combined in the form of a known rocker switch having a central neutral switch position.

15. An individual light switch having a two-wire connection according to one or more of claims 9 to 14 for lighting installations controlled automatically by pulse switches according to one or more of claims 1 to 8, characterised by two wiring points and an electrical connection between them, a switch element (18, 19) which may be operated by a temporary current pulse connected in the electrical connection and two

- 7 -

switch elements (21) and (23) which may be operated independently of each other having a normal switch position and a temporary adjustable, variable switch position, whereby one switch element (21) is connected
5 into the electrical connection between the wiring points and it closes this electrical connection in its normal switch position, whereas the other switch element (23) is connected in parallel to the switch element (18) such that it even closes for a short time the electrical
10 connection between the wiring points in its temporary adjustable, variable switch position when the electrical connection is opened by the switch element (18).

16. A light switch according to claim 15, characterised in that the switch element (18) is designed in the form of a switch contact to be actuated by
15 a magnet coil, whereby the magnet coil and the switch contact actuated thereby are connected in series to each other in the electrical connection between the wiring points so that the switch contact is closed when
20 current flows through this electrical connection, and it is kept closed as long as current flows through it and it is opened when there is no current flowing through the magnet (19).

17. A light switch according to claim 15 or
25 16, characterised in that the switch elements (20, 21) and (22, 23) are designed and combined in the form of a known rocker switch having a central neutral switch position, whereby in the central neutral position, the switch element (20, 21) keeps the contact and
30 thereby the electrical connection closed and it opens these for a short time upon actuation, whereas the switch element (22, 23) keeps the contact open and closes it for a short time upon actuation.

18. An individual light switch according to
35 any of claims 9, 10, 12 and 14, 16 and 17, characteri-

- 8 -

sed in that the magnet coil of the switch element which may be operated by a temporary current pulse is designed in the form of a double magnet having a common magnet core and two magnet coils connected in parallel with respectively one switch contact operated by the respective magnetic switch and connected in series to the magnet coil, whereby one magnet coil is designed for low magnet power and it closes its contact and keeps it closed when energised, whereas the other coil and optionally also the contact lever is designed such that its contact closes and may be kept closed where there is an intensity of current which corresponds to at least approximately three times the minimum intensity of current at which the magnet switch with the magnet coil closes the associated contact and keeps it closed.

19. An individual light switch according to claim 11, characterised in that the two magnet coils are wound one upon the other over a common magnet core.

20. An individual light switch according to claim 11 or 12, characterised in that the magnet core is formed from sheets mounted in parallel.

- 8 -

- sed in that the magnet coil of the switch element which may be operated by a temporary current pulse is designed in the form of a double magnet having a common magnet core and two magnet coils connected in parallel
- 5 with respectively one switch contact operated by the respective magnetic switch and connected in series to the magnet coil, whereby one magnet coil is designed for low magnet power and it closes its contact and keeps it closed when energised, whereas the other coil
- 10 and optionally also the contact lever is designed such that its contact closes and may be kept closed where there is an intensity of current which corresponds to at least approximately three times the minimum intensity of current at which the magnet switch with the magnet coil
- 15 closes the associated contact and keeps it closed.
19. An individual light switch according to claim 11, characterised in that the two magnet coils are wound one upon the other over a common magnet core.
20. An individual light switch according to claim 11 or 12, characterised in that the magnet core is formed from sheets mounted in parallel.

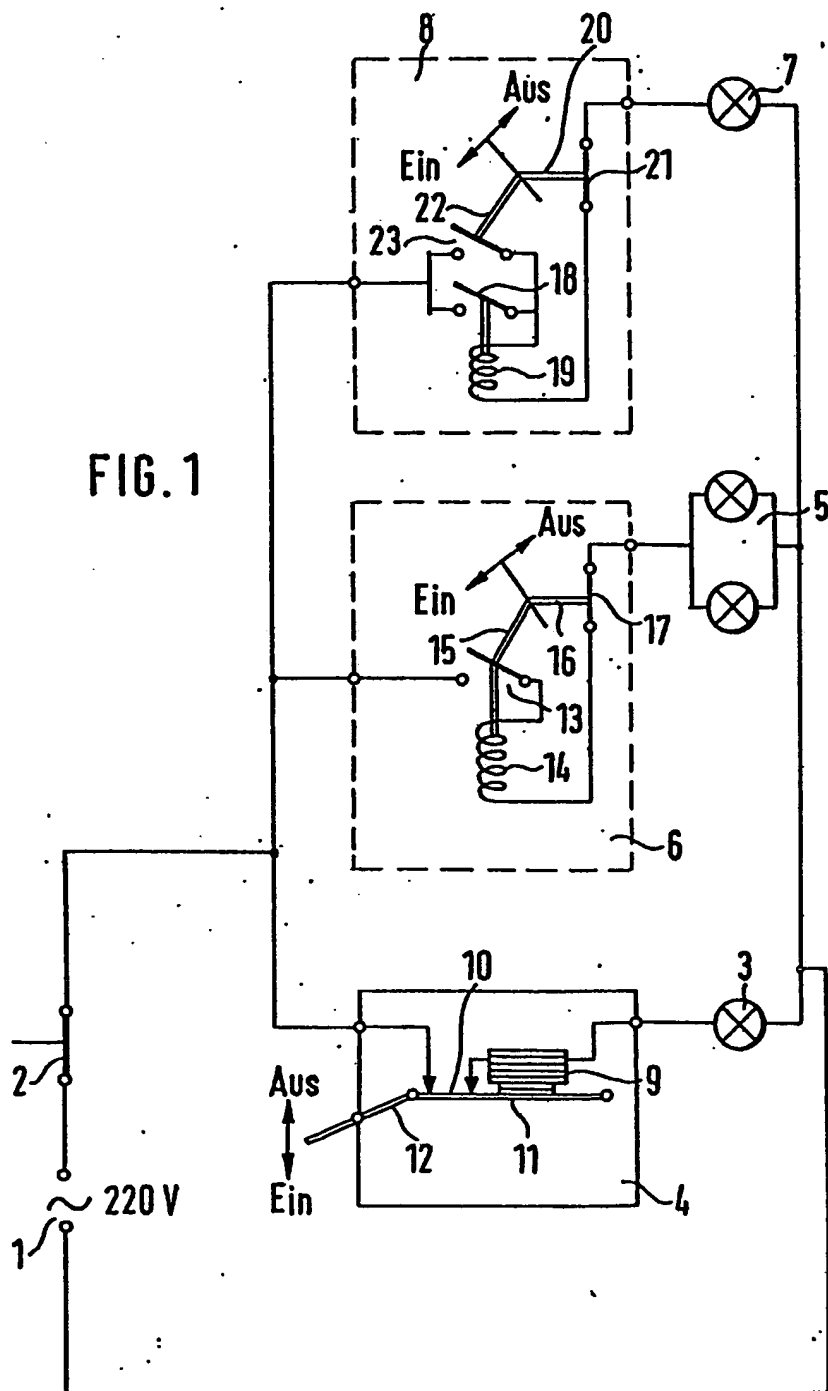
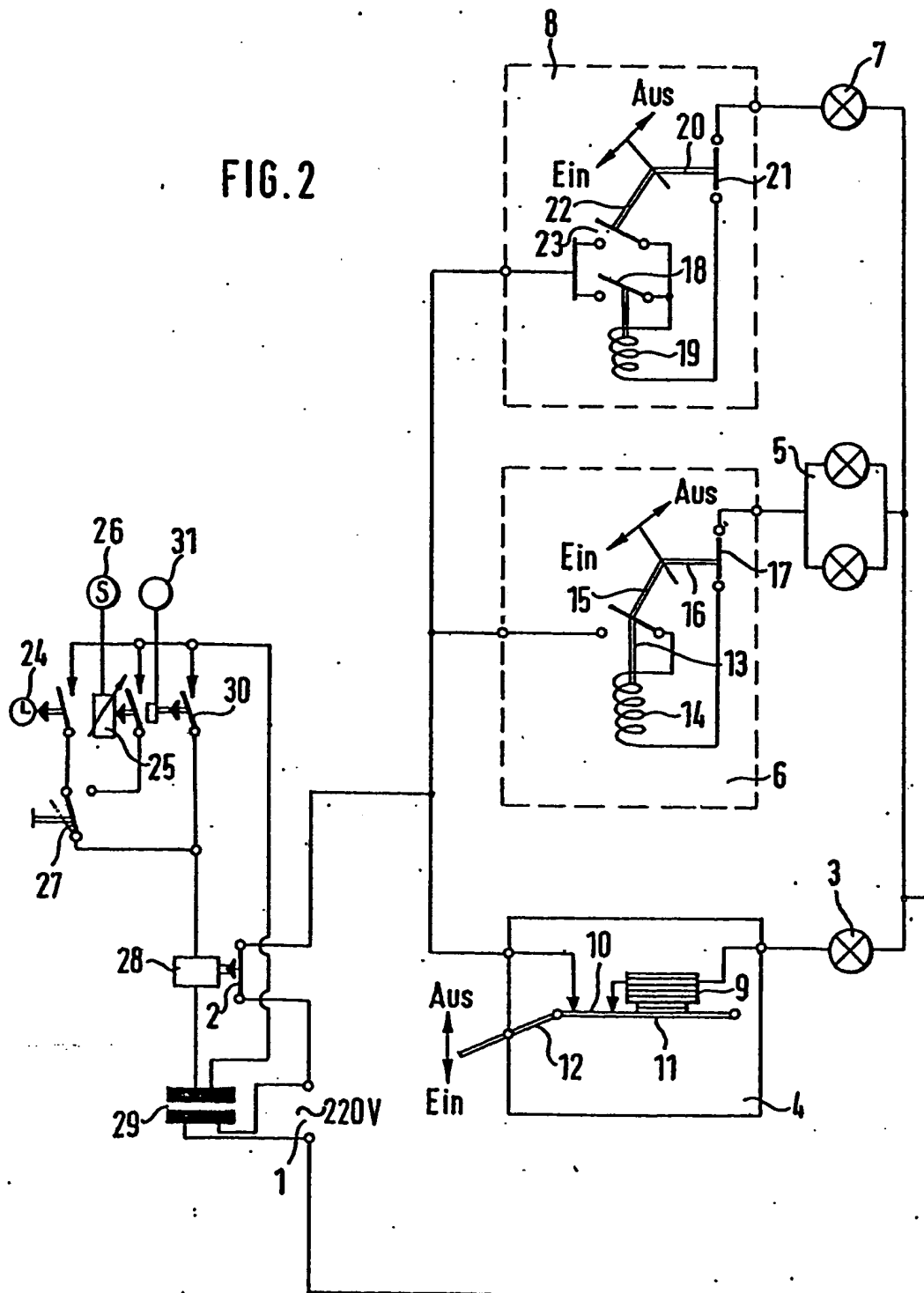
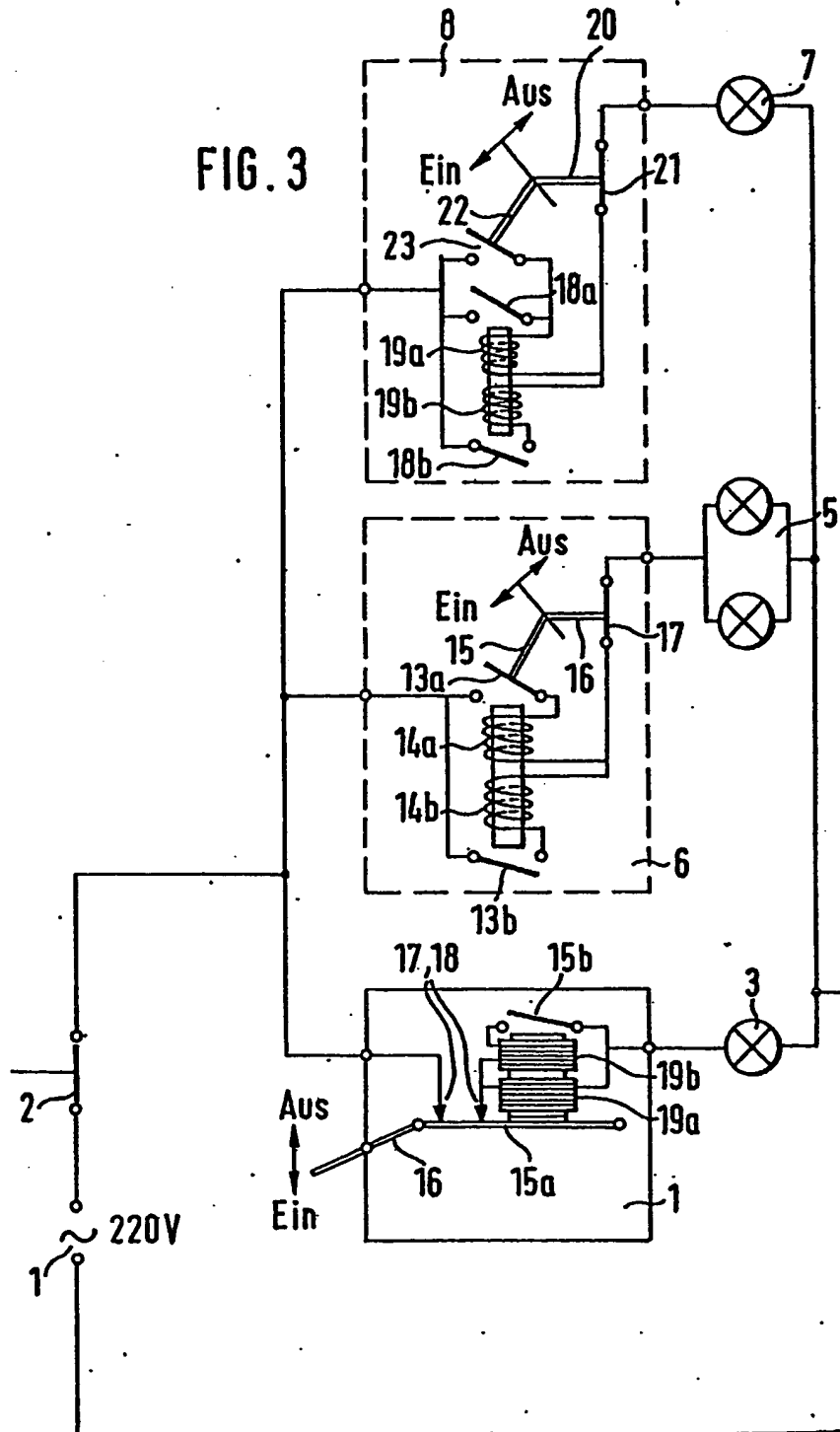


FIG. 2

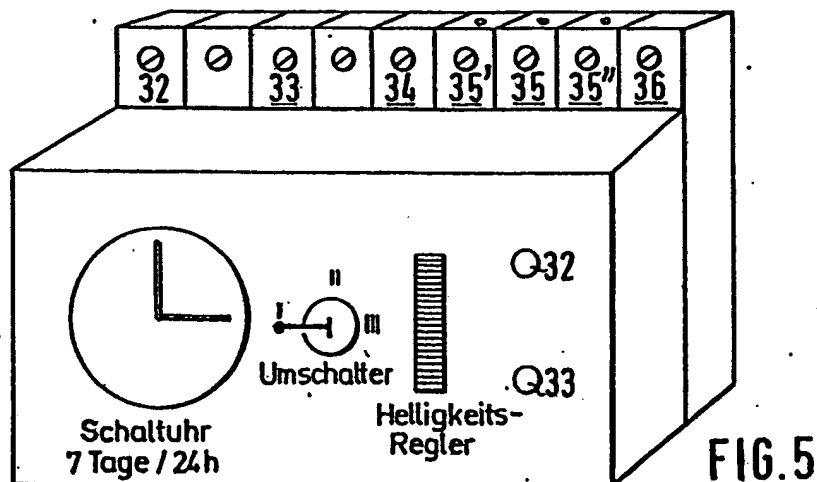
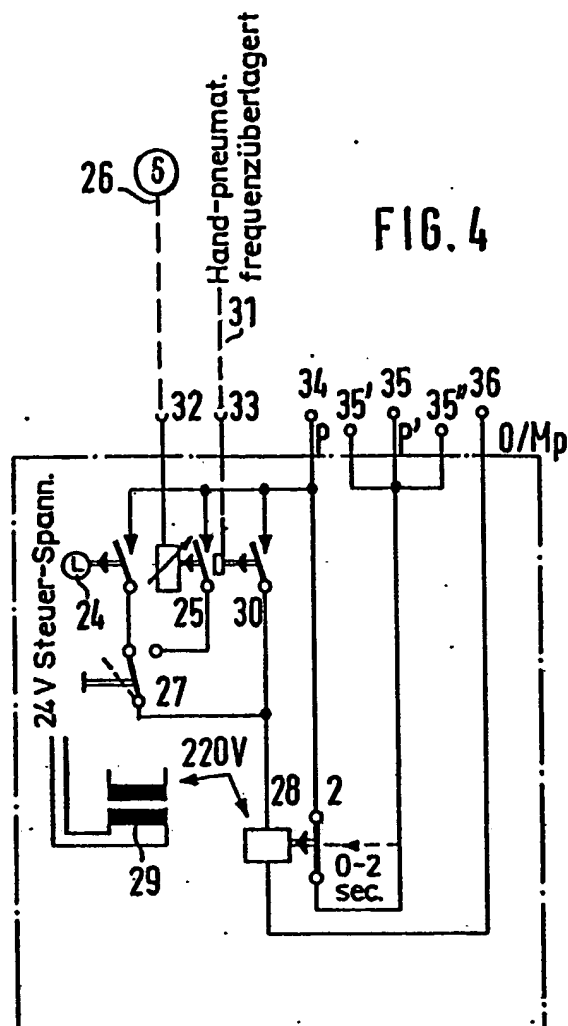


3/7

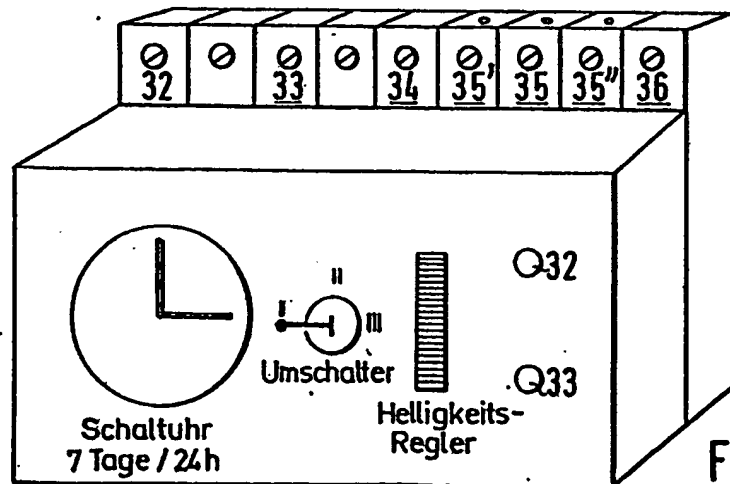
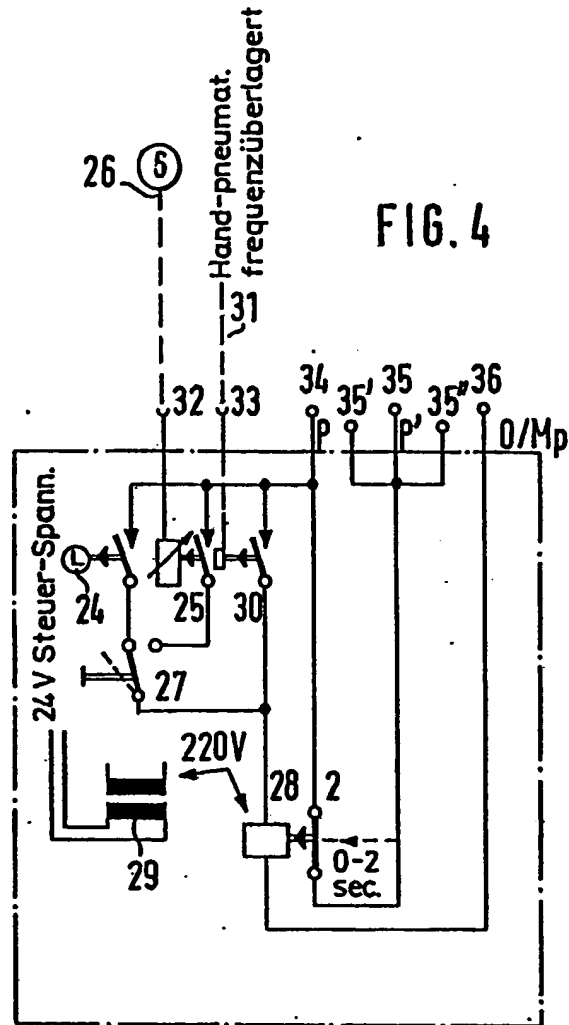
FIG. 3



4/7



4/7



5/7

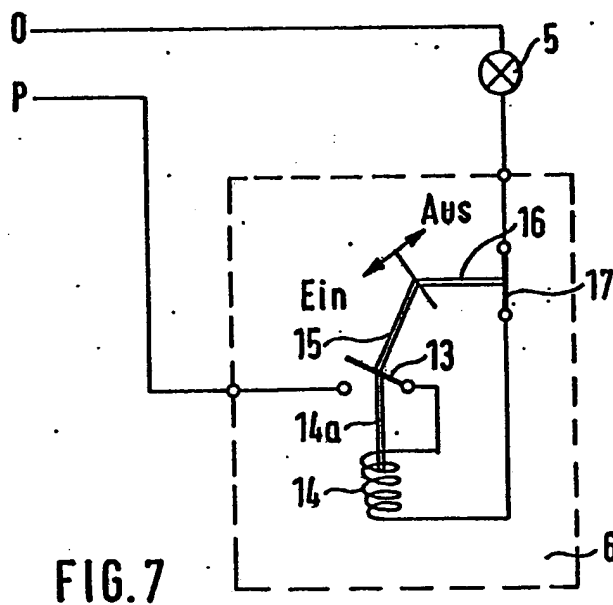


FIG. 7

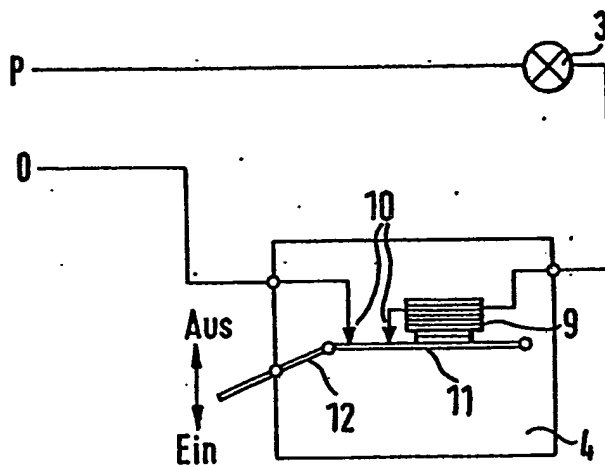


FIG. 6

6/7

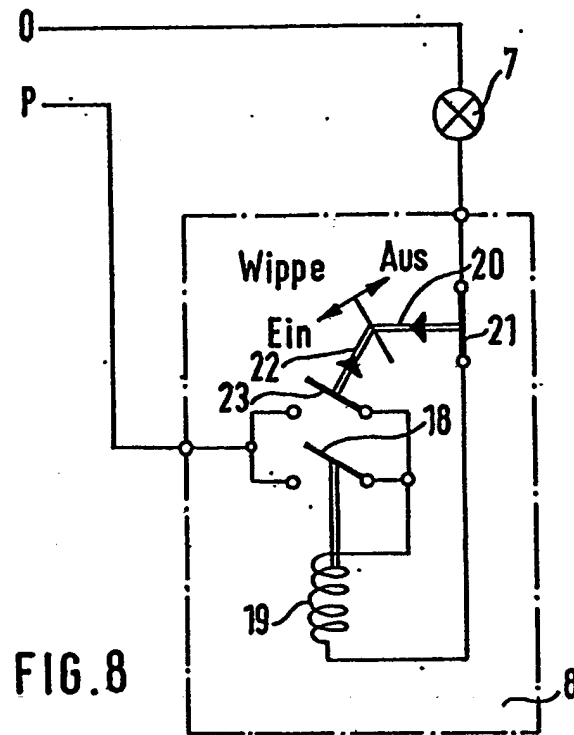
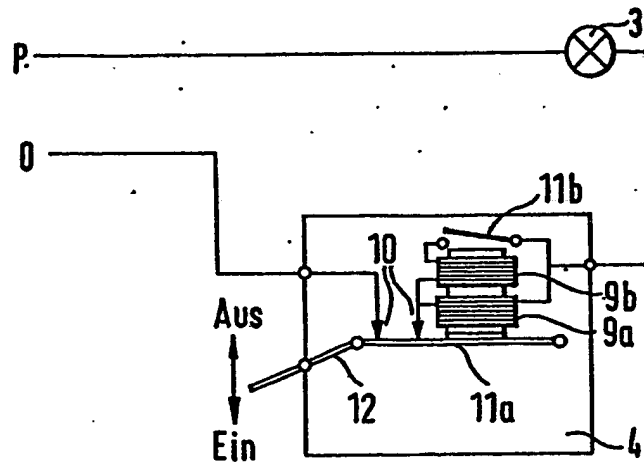


FIG. 9



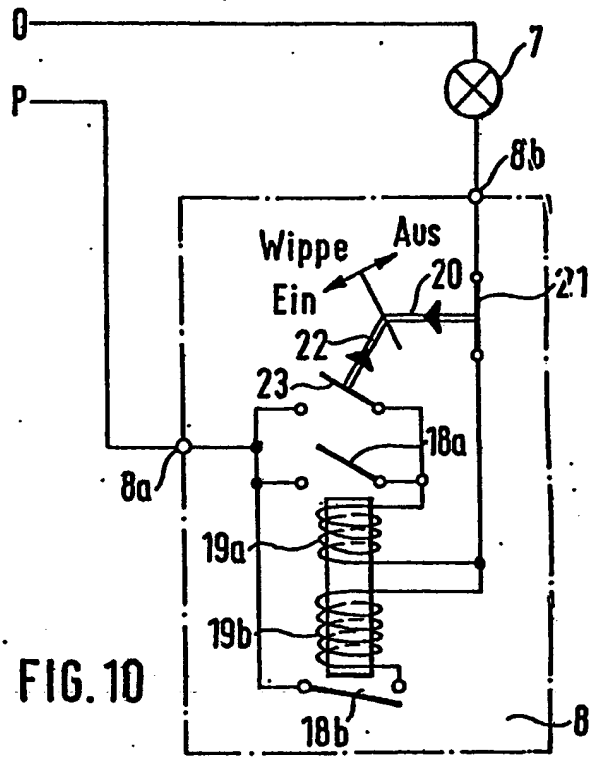


FIG. 10

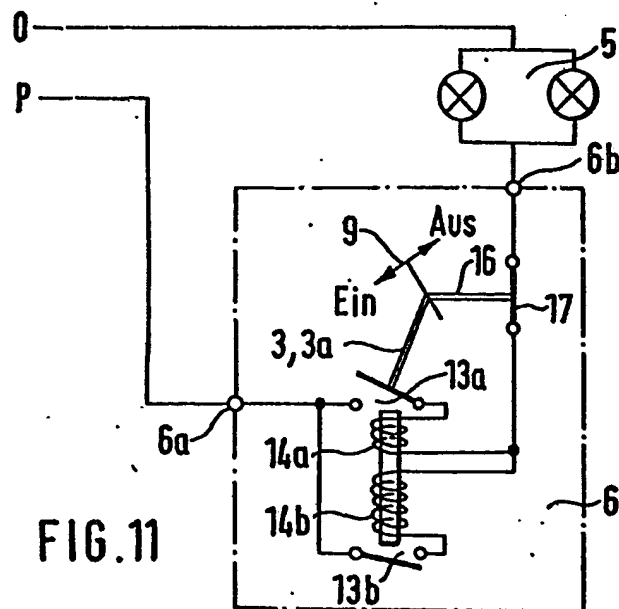


FIG. 11



European Patent
Office

EUROPEAN SEARCH REPORT

0040339
Application number

EP 81103295.2

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>US - A - 3 483 424</u> (WOODNUTT) + Totality + --		H 05 B 39/04
A	<u>US - A - 2 248 271</u> (GUIN) + Totality + --		
A	<u>US - A - 2 476 517</u> (TITUS) + Totality + --		
A	<u>GB - A - 1 296 539</u> (SOCIETE DES ACCUMULATEURS) + Totality + --		TECHNICAL FIELDS SEARCHED (Int. Cl.)
A	<u>GB - A - 724 637</u> (PHILIPS) + Totality + --		H 05 B 39/00 H 01 K 1/00
A	<u>GB - A - 162 587</u> (PIETER DAS) + Totality + --		
A	<u>GB - A - 483 275</u> (BATTERIES LTD.) + Totality + --		
A	<u>DE - B - 1 665 501</u> (RUHSTRAT KG) + Totality + ----		CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
X The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search VIENNA		Date of completion of the search 21-08-1981	Examiner VAKIL

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER: _____**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.